HIGHLIGHTS

Women

- Female students are similar to males in completion of high school mathematics courses, according to the 1994 National Education Longitudinal Study Transcripts. More than half of both male and female high school graduates in 1992 had taken algebra I, algebra II, and geometry, but far fewer had taken trigonometry and calculus in high school. Nevertheless, the same percentages of male and female students had taken these advanced courses: about 17 percent of both male and female graduates had taken trigonometry, 9 percent of both had taken calculus, and 7 percent of both had taken advanced placement calculus. The proportion of both male and female high school graduates who took each of these mathematics courses increased from 1982 to 1994.
- Male and female high school graduates were also similar in science course taking in 1994. Female students were slightly more likely than males to have taken biology and chemistry, and males were slightly more likely than females to have taken physics: most students, more than 90 percent, had taken biology, slightly more than half had taken chemistry, and about one-fourth had taken physics. A larger proportion of both male and female high school students in 1994 took biology, chemistry, and physics than did 1982 graduates.
- Results of the 1996 National Assessment of Educational Progress (NAEP) mathematics assessment[1] showed that the gender gap in mathematics achievement has, for the most part, disappeared. Previous NAEP mathematics assessments showed that males scored higher than females in grade 12, but in 1996, average mathematics scores for males and females in 8th and 12th grade were not significantly different.[2] Among 4th graders, the average mathematics score for male students was slightly higher than that of female students.
- Among 12th graders, female students scored slightly lower than male students on the 1996 NAEP science assessment (152 for males and 148 for females). The difference in males' and females' science scores at grades 4 and 8 are not statistically significant.
- An examination of Scholastic Assessment Test (SAT) mathematics test scores for only the students who reported taking the highest level of mathematics (calculus) and science (physics) showed that women scored lower on average than men. Among those who took calculus, women averaged 594 and men 631 on the SAT mathematics; this difference—of 37 points—is similar to that for men and women test takers in general (35-point difference). Among those who took physics, women averaged 542 and men 577—a 35-point gap.
- From the SAT and ACT student data, it is clear that a larger number of women than men who choose to take college entrance tests are from lower income families. Although the proportions of test takers from the higher family income groups were about evenly split between males and females, among the lowest income groups, women accounted for more than 60 percent of the test takers. Given that parental income is related to average scores, then the higher proportion of women test takers who are from lower income families would reduce the averages for women test takers in general.
- The number of science and engineering doctorate degrees awarded to women increased 69 percent over the 10-year period, from

[1] The National Assessment of Educational Progress (NAEP), funded by the National Center for Education Statistics in the U.S. Department of Education, is designed to determine the achievement levels of precollege students in a number of areas, including mathematics and science, and to measure changes in achievement over time. Both mathematics and science assessments are administered periodically to students in the 4th, 8th, and 12th grades. National results are reported by NAEP for each grade level and within various subgroups (e.g., males and females, racial/ethnic groups).

[2] Here, as elsewhere in the report, tests of significance are calculated at the 0.5 level.

4,891 in 1985 to 8,273 in 1995. The *proportion* of total science and engineering doctoral degrees that were awarded to women increased from 26 percent of total science and engineering degrees in 1985 to 31 percent in 1995.

- Women received a minority of science and engineering doctorates in all fields except psychology. The proportion of women receiving the doctorate in psychology rose from 51 percent in 1985 to 64 percent in 1995. Women received 38 percent of all social science doctoral degrees awarded in 1995, but their participation within the various social science disciplines varied. For example, women received 24 percent of the economics degrees, but they received 58 percent of all the anthropology doctoral degrees and 53 percent of the sociology degrees.
- Women constitute 51 percent of the U.S. population, 46 percent of the U.S. labor force,[3] and 22 percent of scientists and engineers in the labor force. The lesser representation in science and engineering compared to the labor force as a whole can be explained in part by their more recent entry into science and engineering as well as a slightly greater tendency of women trained in science and engineering to be employed outside of science and engineering.[4]
- Among those in the labor force, unemployment rates of men and women scientists and engineers are similar: 2.0 percent of women and 2.2 percent of men were unemployed in 1995.
- Among all scientists and engineers in academic employment, women are more likely than men to be employed in elementary or secondary schools (11 percent versus 4 percent) and in 2-year colleges (12 percent versus 9 percent).
- In 4-year colleges and universities, women scientists and engineers hold fewer high-ranked positions than men. Women are less likely than men to be full professors, and are more likely than men to be assistant professors or instructors. Among ranked science and engineering faculty, 49 percent of men and 24 percent of women are full professors. Part of this difference in rank can be explained by age differences, but differences in rank remain even after controlling for age. Among those ages 45 to 54, 40 percent of women and 61 percent of men are full professors.[5]
- Women are also less likely than men to be tenured. Thirty-five percent of full-time employed women science and engineering faculty are tenured, compared to 59 percent of men. Some, but not all, of the differences in tenure may be attributable to differences in age. Among full-time employed science and engineering faculty ages 45 to 54, 57 percent of women and 76 percent of men are tenured.[5]
- Although roughly the same proportion of men and women had no publications (17 percent of women and 18 percent of men), women faculty had, on average, fewer publications in refereed journals since 1990 than men. Among doctoral scientists and engineers who were employed full time in colleges or universities and who received their doctorates in 1990 or earlier, 45 percent of women and 34 percent of men had 1 to 5 publications, and 38 percent of women and 48 percent of men had more than 5 publications since 1990.
- Differences in research support do not appear to be a factor in differences in publications. Women faculty are as likely as men to be supported on Federal contracts or grants—44 percent of women and 45 percent of men faculty were supported by Federal contracts or grants.
- Women are less likely than men to engage in managerial activity—22 percent of men and 18 percent of women cite management or administration as their primary work activity. Among those of similar ages, even less difference in managerial status is evident. Among scientists and engineers between the ages of 35 and 44, 19 percent of women and 21 percent of men are managers or administrators. Differences in field are also related to differences in primary work activities. For example, men are more likely than women to be engineers and physical scientists and are thus more likely to be engaged in research and development.

[3] The labor force referred to here consists of civilians who are 20 years old or older who are either employed or actively seeking employment.

[4] The science and engineering field in which women earn their degrees influences participation in the science and engineering labor force. A large proportion of women earn degrees in the social sciences, which are defined by NSF as science and engineering, and are then employed in social services occupations, e.g., social worker, clinical psychologist, which are defined by NSF as non–science-and-engineering occupations.

[5] Differences in field, time since degree and number of publications are likely to explain an additional portion of the differences.

- Although men and women scientists and engineers of similar ages are about equally likely to be managers, men are more likely than women to be high-level managers. Women who are supervisors have, on average, fewer subordinates (direct plus indirect) than men. Women supervisors have, on average, 8 direct and indirect subordinates; men have 12. This disparity in number of subordinates holds true among age groups as well.
- Full-time employed women scientists and engineers generally earn less than men, but differences in salary by gender are due primarily to differences in age and field. Women scientists and engineers are younger, on average, than men and are less likely than men to be in computer science or engineering, fields that command higher salaries. The overall median salary for women ($42,000) is much lower than that for men ($52,000), but within fields and within younger age categories the salaries of men and women differ much less. For example, among computer and mathematical scientists with bachelor's degrees between the ages of 20 and 29, the median salary for women was $35,000 and for men it was $38,000 in 1995. With increasing age, however, the gap in salaries of men and women widens.

Minorities[6]

- Although substantial differences in course taking by racial/ethnic groups remain, the percentages of black, Hispanic, and American Indian students taking many basic and advanced mathematics courses doubled between 1982 and 1994. For example, in 1982, 22 percent of black high school graduates had taken algebra II. By 1994, 44 percent had taken this course.
- Racial/ethnic groups differ greatly in mathematics course taking. Black and Hispanic high school graduates in 1994 were far more likely than white and Asian students to have taken remedial mathematics courses. Thirty-one percent of black, 24 percent of Hispanic, and 35 percent of American Indian high school graduates, compared with about 15 percent of whites and Asians had taken remedial mathematics in high school.
- Significant differences in mathematics and science achievement by race/ethnicity remain. Average mathematics scores increased for all racial/ethnic groups since 1990, but differences between white students and black and Hispanic students have not significantly decreased. For example, among 12th graders in 1990, the average difference between white students' mathematics scores and those of black students was 33 points. In 1996, it was 31 points.[7] The average difference between white students' mathematics scores and those of Hispanic students was 25 points in 1990; in 1996, it was 24 points.
- College enrollment and degree attainment by minorities have been increasing. Although minority enrollment in undergraduate programs dropped in the early 1980s, it has been steadily increasing since 1984, both in numbers and as a percentage of total undergraduate enrollment. In 1984, underrepresented minorities were 14.6 percent of all undergraduate students; by 1994, they were 20.6 percent. Minority women account for more of the increase in enrollment than do minority men. More than half (59 percent) of minority undergraduate students are women, whereas less than half (44 percent) of white, non-Hispanic undergraduate students are women.
- Of the 325,135 U.S. citizen and permanent resident students enrolled in graduate science and engineering programs in 1995 (both full-time and part-time), 14 percent were minorities. Blacks (6 percent), American Indians (0.5 percent), and Hispanics (4 percent) continued to be underrepresented relative to their proportion in the population.
- Field choices of minority women in science and engineering are more similar to those of white women than they are to those of minority men. Higher proportions of women than men within each racial/ethnic group are in computer or mathematical sciences, life sciences, and social sciences and lower proportions are in engineering. Asian women differ from women in other racial/ethnic

[6] In accordance with Office of Management and Budget guidelines, the racial/ethnic groups described in this report will be identified as white, non-Hispanic; black, non-Hispanic; Hispanic; Asian or Pacific Islander; and American Indian or Alaskan native. In text and figure references, these groups will be referred to as white, black, Hispanic, Asian, and American Indian. In instances where data collection permits, subgroups of the Hispanic population will be identified by subgroup name. The term "minority" includes all groups other than white; "underrepresented minorities" includes three groups whose representation in science and engineering is less than their representation in the population: blacks, Hispanics, and American Indians.

[7] The National Assessment of Educational Progress measures mathematics achievement on a scale ranging from 0 to 500.

groups in that a relatively small proportion are in social sciences.

- With the exception of Asians, minorities are a small proportion of scientists and engineers in the United States. Asians were 10 percent of scientists and engineers in the United States in 1995, although they were 3 percent of the U.S. population. Blacks, Hispanics, and American Indians as a group were 6 percent of the total science and engineeringlabor force in 1995 and 23 percent of the U.S. population.[8] Blacks were 3 percent, Hispanics were 3 percent, and American Indians were less than 1 percent of scientists and engineers.
- In 1995, the unemployment rate of white scientists and engineers was significantly lower than that of other racial/ethnic groups. The unemployment rate for whites was 2.0 percent, compared with 2.8 percent for Hispanics, 2.4 percent for blacks, and 3.4 percent for Asians. The differences in unemployment rates were evident within specific fields of science and engineering, as well as for science and engineering as a whole.
- Racial and ethnic groups differ in employment sector, partly because of differences in field. Among employed scientists and engineers in 1995, 51 percent of black, 57 percent of Hispanic, 64 percent of Asian, and 62 percent of white scientists and engineers were employed in for-profit business or industry. Blacks and American Indians are concentrated in the social sciences, which are less likely to offer employment in business or industry, and are underrepresented in engineering, which is more likely to offer employment in business or industry. Asians, on the other hand, are overrepresented in engineering, and thus are more likely to be employed by private for-profit employers.
- Black, Hispanic, and Asian faculty are less likely than white faculty to be full professors or to be tenured. Some, but not all, of the differences in rank and tenure are related to age differences. Black, Hispanic, and Asian scientists and engineers are younger on average than white and American Indian scientists and engineers. When age differences are accounted for, differences in rank and tenure are reduced. For example, among ranked faculty between the ages of 45 and 54, 50 percent of Hispanic faculty, 55 percent of Asian faculty, and 59 percent of white faculty were full professors. Among black faculty in that age group, however, 25 percent were full professors.
- Black science and engineering faculty had, on average, fewer publications since 1990 than did science and engineering faculty in other racial/ethnic groups. Among scientists and engineers who received their doctorates in 1990 or earlier and who work in 4-year colleges or universities, 29 percent of black faculty had no publications since 1990 compared with 14 percent of Hispanic, 12 percent of white, and 8 percent of Asian faculty.
- Black and American Indian faculty are also less likely than other groups to have Federal grants or contracts. Thirty-five percent of black and 25 percent of American Indian doctoral scientists and engineers employed in colleges or universities are supported by Federal contracts or grants compared to 45 percent of all doctoral scientists and engineers employed full time in colleges or universities.
- Asians are less likely than other groups to be in management or administration (14 percent of Asians compared with roughly 22 percent of Hispanic, white, and black scientists and engineers). Age differences do not explain this difference in managerial activity. Among 35 to 44 year olds, Asians remain less likely to be in management—13 percent of Asians and between 20 and 23 percent of other groups are in management or administration.
- Salaries for scientists and engineers differ little among racial/ethnic groups. Among all scientists and engineers, the median salaries by racial/ethnic group are $50,500 for whites, $50,000 for Asians, $45,000 for blacks, $47,000 for Hispanics, and $48,000 for American Indians. Within fields and age categories, median salaries of scientists and engineers by race/ethnicity are not dramatically different and do not follow a consistent pattern.
- Black and Asian women scientists and engineers are more likely than women from other racial/ethnic groups to be in the labor force and to be employed full time in a field related

[8] The science and engineering field in which blacks, Hispanics, and American Indians earn their degrees influences their participation in the science and engineering labor force. Blacks, Hispanics, and American Indians are disproportionately likely to earn bachelor's degrees in the social sciences, which are defined by NSF as science degrees, and then employed in social service occupations, e.g., social worker, clinical psychologist, which are defined by NSF as non–science-and-engineering occupations. See appendix A for the definitions of science and engineering occupations.

to their degree. Seventy-one percent of black and 72 percent of Asian women scientists and engineers compared with 61 percent of white, 68 percent of Hispanic, and 65 percent of American Indian women scientists and engineers were employed full time in their field.

- Median annual salaries of minority women are more similar to those of both white women and minority men after controlling for field and age. Among engineers in the 20- to 29-year-old age group, for example, the median salary of Hispanic women was $40,000, for black women $42,000, for Asian women $37,700, and for white women $38,800. Median salaries for men engineers in the same age group ranged from $38,000 to $40,000.

Persons With Disabilities

- Students with disabilities take fewer science and mathematics courses and have lower grades and lower achievement scores than students without disabilities. Students with disabilities are also more likely to drop out of high school than students without disabilities.
- About 5 percent of students taking the SAT, or more than 40,000, checked one of the categories indicating a disability; the ACT also had 5 percent of students (almost 20,000) who indicated a disability category in 1996.
- Among SAT test takers, almost 20,000 students took the test under nonstandard conditions. These test takers had average scores (463 verbal and 452 mathematics) that were below that of the average of all test takers who indicated on the student questionnaire that they had a permanent disability (472 verbal and 468 mathematics).
- Although the number of persons with reported disabilities who received science and engineering doctorates in 1995 was very small, the total has been increasing rapidly: the 355 recipients in 1995 were a 78 percent increase from the 200 science and engineering doctorates in 1989. Persons reporting disabilities constituted 1.3 percent of all doctorate recipients in 1995, up from 0.9 percent of the total in 1989.
- The labor force participation rates of scientists and engineers with and without disabilities are quite different. Almost one-third of scientists and engineers with disabilities are out of the labor force, compared with 11 percent of those without disabilities. Although age accounts for some of the tendency for persons with disabilities to be out of the labor force (because of retirements), chronic illness or permanent disability is also a factor. The primary reason for not working for both persons with and without disabilities was retirement (76 percent versus 60 percent), but 21 percent of persons with disabilities and 2 percent of those without disabilities cited chronic illness or permanent disability.
- Faculty who have disabilities are more likely than those without disabilities to be full professors and to be tenured. The differences in rank and tenure are related to differences in age. Because incidence of disability increases with age, scientists and engineers with disabilities tend to be older and to have greater years of professional work experience than those without disabilities.
- Science and engineering faculty with disabilities are less likely to have publications than those without disabilities. Twenty-two percent of those with disabilities and 17 percent of those without disabilities had no publications since 1990. Faculty with disabilities had fewer publications than those without disabilities—43 percent of those with disabilities and 46 percent of those without disabilities had 6 or more publications since 1990. Faculty with disabilities (38 percent) were also less likely than those without disabilities (45 percent) to have been supported on Federal grants or contracts.
- The type of work done by scientists and engineers with disabilities is similar to the type of work done by those without disabilities. The primary work activity of 37 percent of scientists and engineers with disabilities is research and development, compared with 38 percent of those without disabilities. Twenty-five percent of scientists and engineers with disabilities and 21 percent of those without disabilities are in management or administration. Among those with supervisory responsibilities, persons with and without disabilities have about the same number of subordinates (12 and 11, respectively).
- Median salaries of scientists and engineers with disabilities do not differ substantially from median salaries for those without disabilities. Among all scientists and engineers, the median salary for those with disabilities is $51,000; for those without disabilities it is $50,000. Salaries differ little within fields and age groups as well.